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The invention relates to a device of connection of fluid for an exchanger of heat of motor vehicle.

An exchanger of heat of this kind is usually crossed by a fluid, generally of the water added with an antifreeze, being used for cooling of the engine of the vehicle. This exchanger of heat can consist either of a radiator of cooling of the engine, or in a heating radiator of the cockpit. In an exchanger of heat of this kind, are envisaged two devices of connection being used one for the entry and the other at the exit of the fluid.

In its usual form, such a device of connection comprises a pipe which depends on a collecting box, or radiator tank, exchanger of heat and on which a flexible tube maintained by a clamp is fixed. This pipe generally came from moulding with the collecting box which can be built, for example, out of plastic.

In the current motor vehicles, the driving compartment is encumbered more and more by various equipment and accessories, so that the place reserved for the latter is limited more and more.

It results from it that the flexible tubes mentioned previously must be deformed to follow a course tormented between the equipment and accessories and to be connected to the pipes of the exchanger of heat.

This has for principal disadvantages of complicating the assembly of the engine and its various equipment and accessories on the assembly lines, but also of involving pressure losses in the coolant circuit of the engine.

It is known, as shown by document FR-A-2 526.932, to envisage rectilinear pipes which are connected in directions chosen compared to a collecting box of exchanger of heat. One can thus choose the orientation of the flexible tube compared to the collecting box on which it is connected.

But, owing to the fact that the connection of the flexible tube is carried out then in the axis of the pipe, it is not possible to subject to this pipe a change of abrupt direction in the vicinity immediate of the pipe.

It is known also to use bent pipes, but these last cannot be easily manufactured by moulding. Moreover, it is impossible to build a fluid box comprising a bent pipe come from moulding with it.

The purpose of the invention is in particular to overcome the above mentioned disadvantages.

It is in particular a goal of the invention to get a device of connection of fluid for an exchanger of heat of motor vehicle which makes it possible to connect a flexible tube, or another conduit, in a position or a configuration chosen compared to this exchanger of heat.

It is also a goal of the invention to get such a device of connection which can be carried out in a particularly simple way by operations of moulding and/or machining.

▲ top It is still a goal of the invention to get such a device which does not require modification collecting boxes of the exchanger of heat on which it must be assembled.

The purpose of the invention is also to get such a device of connection which involves a minimum of pressure loss in the circuit of the fluid crossing the exchanger of heat.

The invention to this end proposes a device of connection of fluid for an exchanger of heat of motor vehicle, including/understanding a first pipe and a second pipe having respective rings of connection of combined form, which depend each one of a tubular body characterized in that the ring of connection of the first pipe extending in a general plan tilted from an angle chosen compared to a plan perpendicular to the axis from the tubular body from this pipe and in what the ring of connection of the second pipe extends in a general plan.

The ring of connection of the first pipe gets thus a plan of connection nonperpendicular to the axis of the body of the pipe which with the shape of a right tube.

So the axis of the first pipe is tilted compared to the axis of the second pipe, which makes it possible to give to this second pipe an orientation chosen compared to the first pipe.

Moreover, this first pipe can be carried out easily by traditional operations of moulding and/or machining owing to the fact that it does not comprise bent parts.

In an embodiment preferred of the invention, the general plan extends perpendicular to the axis from the body of this pipe.

The second pipe can be also carried out easily by operations of traditional moulding and/or machining, owing to the fact that it does not comprise a bent part.

The term "ring of connection" such as it is used here intends to indicate, in a general way, part of general form annular

which is attached to the body of a pipe to allow its connection an annular part of combined form that another pipe comprises. Such a ring of connection can consist for example of a flange or a support.

In an embodiment preferred of the invention, the ring of connection of the first pipe comprises a fitment female, while the ring of connection of the second pipe comprises a male fitment.

In an advantageous way, fitment female of the first pipe forms a seat with spherical range for an O ring and the male fitment of the second pipe is a hollow cylindrical prolongation around whose the O ring is placed. One thus obtains a hermetic seal by bringing and tightening one against the respective rings of connection of the first and the second pipe.

Advantageously, the first pipe comprises an end for the connection of a flexible tube, while the second pipe is connected to a collecting box of an exchanger of heat.

In alternative, the first pipe is connected to a collecting box of exchanger of heat, while the second pipe comprises an end for the connection of a flexible pipe.

The pipe which is connected to the collecting box of the exchanger of heat is advantageously obtained from moulding with the collecting box, which is preferably made out of plastic.

According to another characteristic of the invention, the device includes/understands means of immobilization to maintain in support the respective rings of connection of the first pipe and second pipe.

The first pipe and the second pipe are advantageously carried out each of only one part per matter moulding, for example of plastic.

In the description which follows, only made as example, one refers to the annexed drawing, on which:

figure 1 is a partial sight of rise showing a device in connection according to the invention, connected on the one hand to a collecting box of exchanger of heat and on the other hand to a flexible tube;

figure 2 is a sight partially of rise and partially out of cut of part of the device of connection of figure 1;

figure 3 is a cross-section of the first pipe of the device of connection of figures 1 and 2; and

figure 4 is a cross-section, on scale reduced, according to line IV-IV of figure 2.

One refers first of all on the figure 1 which represents a device of connection of fluid 10 according to the invention, connected on the one hand to a collecting box 12 of an exchanger of heat, for example of a radiator of cooling of an engine of motor vehicle, and on the other hand with a flexible tube 14. Device 10 is intended to establish a connection between the box collecting 12, still called radiator tank, and the pipe 14 to introduce a fluid into this collecting box or to make some leave.

Device 10 includes/understands a first pipe 16 connected to the pipe 14 and one second pipe 18 connected to the collecting box 12, pipes 16 and 18 being assembled between them.

First pipe 16 has a ring of connection 20 which depends on a tubular body 22 component an end on which is fixed the pipe 14. Second pipe 18 includes/understands a ring of connection 24 which depends on a tubular body 26 connected to the radiator tank 12. The rings of connection 20 and 24 have combined forms and are maintained in support by two screws 28, of which only one is visible on figure 1.

As shown more particularly on figures 2 and 3, the tubular body 22 of first pipe 16 is a rectilinear tube which presents a form of revolution around an axis A1. The tubular body 22 comprises, at an end, the ring of connection 20 and, at its opposed end, a peripheral pad 30 (figure 3). This pad is intended to prevent the extraction of the pipe 14, which is advantageously maintained by a clamp 32 (figure 1).

As shown more particularly on figures 2 and 3, the ring of connection 20 of first pipe 16 extends in a plan P1 general which is tilted of a selected angle B compared to a P0 plan perpendicular to the axis A1 of the body 22 of the pipe. The angle B is an acute angle of selected value which is generally lower than 45 DEG.

The ring of connection 20 of first pipe 16 comprises a fitment female 34 here made up of an annular seat with spherical range whose center O is located at the intersection of the axis A1 and the P1 plan (figure 3).

Pipe 16 can be carried out of only one part per moulding of an adapted matter, for example metal or plastic. This moulding is particularly easy to carry out owing to the fact that the tubular body 22 is right, so that the release from the mould can be done in the direction of the axis A1.

The tubular body 26 of second pipe 18 is rectilinear and has a form of revolution around an axis A2 (figure 2). This axis A2 is laid out according to an orientation chosen compared to the collecting box 12, as taught for example by document FR-A-2 526.932 already mentioned.

The ring of connection 24 of second pipe 18 extends in a plan P2 general (figure 2) which is perpendicular to the axis A2 of body 26. The ring of connection 24 has a male fitment comprising a cylindrical prolongation 36 of axis A2 which is connected to the ring 24 by an annular shoulder 38. An O ring 40 is placed around the cylindrical prolongation 36 so as to come into obstinate against shoulder 38.

The cylindrical prolongation 36 form a male fitment suitable to cooperate with fitment female 34 of ring 20, as shown on figure 2. When the rings 20 and 24 are brought closer one the other as shown on figure 2, their respective plans of connection P1 and P2 are parallel between them and the O ring 40 is placed in spared annular space enters, on a side, the cylindrical prolongation 36 and the annular shoulder 38, and, other side, fitment female 34 with spherical range. In this position, the respective axes A1 and A2 of the tubular bodies 22 and 26 form between them an angle B (figure 2) equal to the angle of inclination B of the P1 plan compared to the P0 plan.

In an alternative not represented, the plan of P2 connection of second pipe 18 could also be tilted for him compared to a plan perpendicular to the axis A2. In this case, the angle formed between the A1 axes and A2 would be different.

Pipe 18 can be carried out of only one part with the collecting box 12 and it can be easily obtained by moulding, for

example starting from a plastic.

As shown on figure 4, the ring of connection 24 has a general form of rhombus to the angles rounded so as to spare two ears 42 diametrically opposite likely to be crossed each one by a screw 28. Each screw 28 is specific to pass through a hole of ring 20 (figures 2 and 4) and to cooperate with a hole threaded 44 spared in the ring of connection 24, similar form, second pipe 18. By tightening two screws 28, one causes the compression of the joint 40 which forms sealing in the zone of connection of pipes 16 and 18.

Thus, the device of connection 10 makes it possible to give to the pipe a 16 selected angular orientation compared to the pipe 18 which, it also, has a selected angular orientation compared to the collecting box 12. The pipe 14 can thus circumvent for example an obstacle consisted an accessory located near to the collecting box.

Of course, the invention is not limited to the embodiment described previously as example. The respective functions of the first and the second pipe can be reversed, the first pipe being then connected to the radiator tank and the second pipe with the flexible tube. Moreover, like already indicated previously, the second pipe can also have a plan of connection which is not perpendicular with the axis of the body of the pipe. Moreover, average the formant fitment between the two pipes are not limited to a fitment male-female of the type describes previously.

The device of the invention can be carried out in a particularly simple way, in particular by moulding, without requiring complicated operations like those used for the manufacture of bent pipes.